Nematology Circular No. 111
October 1984

Fla. Dept. Agric. & Consumer Serv.
Division of Plant Industry

# NEMATODES WHICH CAUSE DECLINE OF GARDENIA

P. S. Lehman[1]

ROOT-KNOT NEMATODE: Meloidogyne species have been associated with decline of Gardenia jasminoides Ellis for many years. Root-knot disease on gardenia was first reported by Beijerinck in 1887 (1). In 1889, Neal reported that gardenia was one of many hosts of root-knot nematode found in Florida (8). Prior to this time, the root-knot nematode was recognized as a pest of many plants in Florida. In 1889, when Neal described gardenia as a host he also wrote: "In 1876 I found the root-knot prevalent over Florida, and I learned from old residents that as far back as 1805 it had been known, and from time immemorial had been dreaded as a foe to gardens and groves" (8).

Results from samples submitted to the Division of Plant Industry, Florida Department of Agriculture and Consumer Services, showed that root-knot nematodes were found in about 50% of the sites sampled during the past 10 years. Studies have shown that Meloidogyne arenaria (Neal) Chitwood, M. incognita (Kofoid and White) Chitwood, and M. hapla Chitwood cause a decline of gardenia (2,3). When roots are severely galled by nematodes, few feeder roots develop, and the tops of infected plants are often chlorotic and stunted (Fig. 1).

Histological examination indicates that galls caused by Meloidogyne spp. on gardenia roots develop in a manner similar to those observed in other hosts. Giant cells develop in the stele around embedded female heads. Newly formed giant cells are

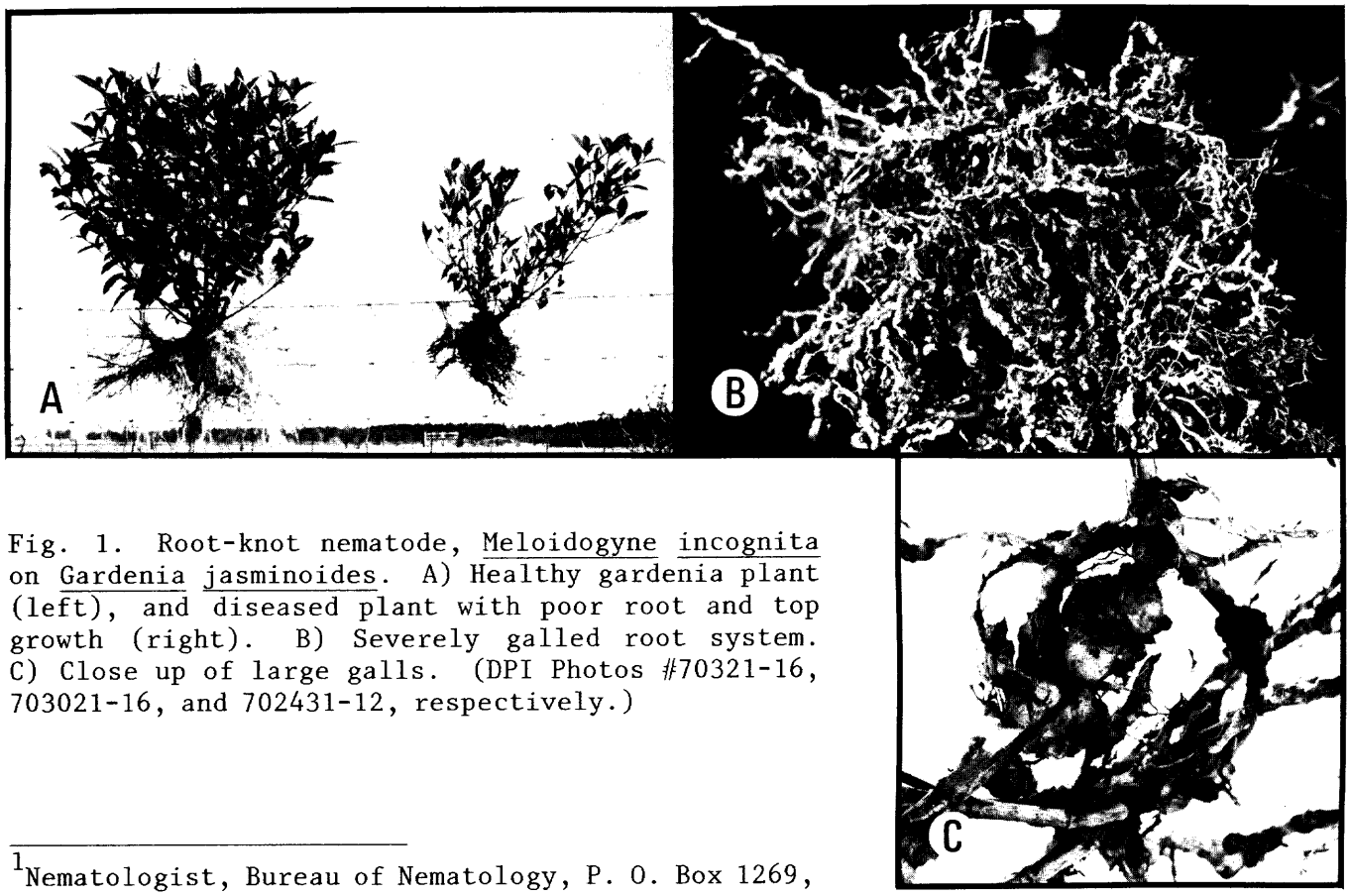


Fig. 1. Root-knot nematode, Meloidogyne incognita on Gardenia jasminoides. A) Healthy gardenia plant (left), and diseased plant with poor root and top growth (right). B) Severely galled root system. C) Close up of large galls. (DPI Photos #70321-16, 703021-16, and 702431-12, respectively.)

[1]Nematologist, Bureau of Nematology, P. O. Box 1269, Gainesville, FL 32602.

vacuolated and contain 30 to 40 nuclei which are larger than those of noninfected cells. Cortical and stelar parenchyma cells proliferate extensively in roots infected by M. incognita and M. hapla. Cellular enlargement, or hypertrophy, is less in M. hapla infected roots than in M. incognita infected roots, and this explains why smaller galls are generally observed with M. hapla infections (3).

OTHER NEMATODES: Although a very high population of spiral nematode, Helicotylenchus nannus Steiner, was reported associated with declining gardenia (4), plant parasitic nematodes, other than Meloidogyne species, are not generally associated with declining gardenia. In microplot studies in North Carolina, dwarf gardenia was not damaged by Criconemella xenoplax (Raski) Luc & Raski, Pratylenchus vulnus Allen and Jensen, or Tylenchorhynchus claytoni Steiner (2).

CONTROL: Certain nematicides applied as soil drenches, bare-root dips, and granular soil mixes have been used successfully to control root-knot nematode on gardenia. In certain cases, nematicides effectively eliminated root-knot nematodes from gardenia plants grown in containers (5,6,7). Although some nematicides are registered presently for use in commercial nurseries, eradication of nematodes with chemicals is seldom 100% effective on all plants.

Chemical treatment must not be used to replace good sanitation practices. Such practices include producing plants on raised benches as prescribed by California Quarantine Proclamation 25, sterilizing pots and planting media, and preventing transfer of root-knot nematodes into noninfested growing areas. It is important that commercial growers use every reasonable sanitation practice to prevent unnecessary problems for homeowners who usually have few options for control of nematodes on established landscape plants.

SURVEY AND DETECTION: Symptoms associated with gardenia decline caused by nematodes are stunting, lack of vigor, yellow or bronzed foliage, dieback of branches, and restricted or distorted root systems. If nematode damage is suspected, soil and root samples should be submitted to a nematode diagnostic laboratory.

LITERATURE CITED:


1. Beijerinck, M. W. 1887. The gardenia root disease. Gardener's Chronicle 1:488-489.
2. Benson, D. M., and K. R. Barker. 1982. Susceptibility of Japanese boxwood, dwarf gardenia, Compacta (Japanese) holly, Spiny Greek and Blue Rug junipers, and nandina to four nematode species. Plant Dis. 66:1176-1179.
3. Davis, R. A., and W. R. Jenkins. 1960. Histopathology of gardenia (Gardenia jasminoides veitchi) infected with three species of Meloidogyne. Nematologica 5:228-230.
4. Konicek, D. E., and H. J. Jensen. 1961. Helicotylenchus nannus, a spiral nematode associated with declining gardenias. Phytopathology 51:65 (Abstr.).
5. Miller, H. N. 1971. Comparisons of three nematicides for the control of Meloidogyne incognita on gardenia. Plant Dis. Reptr. 55:357-360.
6. _____, and K. A. Noegel. 1970. Comparisons of methods of application, rates, and formulations of nematicides for control of root-knot nematodes, Meloidogyne incognita on gardenia plants. Plant Dis. Reptr. 54:966-969.
7. _____, and V. G. Perry. 1965. Elimination of nematodes from nursery plants by chemical bare-root dips. Plant Dis. Reptr. 49:51-53.
8. Neal, J. C. 1889. The root-knot nematode disease of the peach, orange, and other plants in Florida, due to the work of Anguillula. Bull. U.S. Div. Ent. 20:1-31.


---

Contribution No. 280, Bureau of Nematology